UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC., AMAZON.COM SERVICES, LLC,
Petitioner

v.

NOKIA TECHNOLOGIES OY,
Patent Owner

Case: IPR2024-00848
U.S. Patent No. 7,532,808

PATENT OWNER'S RESPONSE

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Exhibit	Description[1]
2013	Orchard Declaration
2014	Havlicek Deposition Transcript
2015	Joint Video Team (JVT of ISO/IEC MPEG & ITU-T VCEG, 3rd Meeting: Fairfax, Virginia, USA, 6-10 May 2002, "Skip Mode Motion Compensation," Document: JVT-C027
2016	*In the Matter of Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, Cameras, and Components and Modules Thereof, Inv. No. 337-TA-1379,* Initial Determination on Violation of Section 337 and Recommended Determination on Remedy and Bond (January 29, 2025)
2017	Thomas Wiegand, Gary J. Sullivan, et al., "Overview of the H.264/AVC Video Coding Standard," IEEE Vol. 13, No. 7, July 2003
2018	Joint Video Team (JVT of ISO/IEC MPEG & ITU-T VCEG, 3rd Meeting: Fairfax, Virginia, USA, 6-10 May 2002, "(Draft) Report of Fairfax Meeting," Document: JVT-C001d3
2019	ISO/IEC 1172-2, First edition, RX-0540, August 1, 1993
2020	*In the Matter of Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, Cameras, and Components and Modules Thereof, Inv. No. 337-TA-1379*, Amazon's Pet. for Review (February 20, 2025)
2021	*In the Matter of Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, Cameras, and Components and Modules Thereof, Inv. No. 337-TA-1379*, Summary of Amazon Respondents' Pet. for Review of ID Finding Violation of Section 337 (February 10, 2025)
2022	*In the Matter of Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, Cameras, and Components and Modules Thereof, Inv. No. 337-TA-1379*, Respondents Responsive Post-Hearing Brief (September 3, 2024)

[1] All of the cited exhibits from *In the Matter of Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, Cameras, and Components and Modules Thereof, Inv. No. 337-TA-1379*, are public versions.

Exhibit	Description[1]
2023	*In the Matter of Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, Cameras, and Components and Modules Thereof, Inv. No. 337-TA-1379*, Amazon's Motion for Summary Determination 808 (June 4, 2024)
2024	K. Lee et al., "Improvement of H.264 Skip Mode," In Proceedings of the Second International Conference on Signal Processing and Multimedia Applications, pages 143-146 (2007)
2025	ITU-T Recommendation H.262, Transmission of Non-Telephone Signals, MPEG2 (07/95)
2026	ITU-T Recommendation H.263, Video coding for low bit rate communication (02/98)
2027	ITU – Telecommunications Standardization Sector, Study Group 16 Question 6, Video Coding Experts Group (VCEG), Thirteenth Meeting: Austin, Texas, USA, 2-4 April, 2001, Document VCEG-M29r1
2028	ITU – Telecommunications Standardization Sector, Study Group 16 Question 6, Video Coding Experts Group (VCEG), Thirteenth Meeting: Austin, Texas, USA, 2-4 April, 2001, Document VCEG-M-TD-1 (r7)
2029	Joint Video Team (JVT) of ISO/IEC MPEG and ITU-T VCEG, 4th Meeting: Klagenfurt, Austria, 22-26 July 2002, "Editor's Proposed Modifications to Joint Committee Draft (CD) of Joint Video Specification (ITU-T Rec. H.264 | ISO/IEC 14496-10 AVC) relative to JVT-D015d5, Document JVT-D017 draft 1

I. INTRODUCTION

U.S. Patent No. 7,532,808 defines a new "skip" mode for encoding and decoding blocks of pixels. The inventor of the '808 Patent was part of the "Joint Video Team" (JVT) that developed the H.264 Standard. Conventional skip mode served a limited "copying" function, efficient, for example, in situations where portions of video frames remained the same over time. One assumption the JVT made was the then-existing skip mode would be the most probable mode and should be the cheapest mode to signal in terms of bitrate overhead. (Ex. 1001, 12:18–19).

However, the inventor of the '808 Patent recognized a problem with this assumption: "compression efficiency [was] seriously degraded" for video sequences containing certain types of regional and global motions (e.g., panning or zooming) because these motions could only be addressed by higher overhead coding modes. (*Id.*, 12:43–48). These higher overhead modes involved using motion vectors to describe from where in reference frames a given block of pixels should be predicted (a category of techniques called "motion compensated prediction"). (*See id.*, Table 3 (listing the then-available coding modes)).[2]

[2] These coding modes, as a POSITA would know, could result in various values (zero or non-zero) of motion vectors depending on the specifics of a given video. (Ex. 2013, ¶ 43).

The inventor rejected existing proposals for addressing regional and global motions as too complex and requiring additional information in bitstreams. (Ex. 1001, 12:47–14:5; *see also id.*, 17:43–52). The inventor realized he could redefine skip coding mode to (A) retain the benefits of conventional skip mode while also (B) addressing regional and global motions. (*Id.,* 14:6–10). A POSITA would recognize the inventor's aspirations were counterintuitive: A block of pixels can only have one coding mode. (Ex. 2014, 64:4–65:5, 66:1–6). An encoder must signal each coding mode with unique signaling so a decoder knows which coding mode to use for a given block of pixels. (Ex. 2013, ¶ 65). Nonetheless, the inventor sought to create a coding mode that adequately addressed both active and non-active scenarios. (*Id.*, ¶ 92; Ex. 2014, 67:1–6).

The inventor retained the benefits of conventional skip mode while minimizing the cost associated with addressing regional and global motions through a paradigm shift in the way coding modes are defined. Specifically, the inventor developed a "local" approach whereby both encoders and decoders consider the presence (or absence) of motion around a skip-coded block to determine *how* to interpret the new skip coding mode. All evidence known to Patent Owner shows the '808 Patent's provisional application is the first time in video coding history that someone developed a coding mode that includes distinct processes for assigning motion vectors that coding devices will interpret based on motion in previously

coded blocks. The beauty of this approach is the information required to represent the motion of previously coded blocks—and thus determine *how* to interpret the new skip mode—is already present in any bitstream. Therefore, no additional information is required to represent non-active and active scenarios around blocks of pixels *using the same lowest cost coding mode*. In this way, the inventor maximized a key value of video coding: exploiting redundancies to minimize the information required to represent video. Additionally, by using existing signaling for conventional skip mode, the inventor avoided any significant restructuring of bitstream syntax (which had already been set by the JVT prior to the invention).

The inventor proposed the new skip coding mode to the JVT. The JVT adopted the contribution, which was incorporated into the H.264 Standard. (*See* Ex. 2015; *see also* Ex. 2018, 9). The co-chairs of the JVT would go on to publish papers praising the new coding mode. (Ex. 2017, 3; Ex. 2019, 15). The inventor expressly defined his new "skip coding mode." The parties agree on the relevant part of this lexicography:

> a coding mode in which a zero (non-active) motion vector or a non-zero (active) motion vector is associated with each skip mode macroblock, depending on the characteristics of the motion in image segments surrounding the macroblock in question.

(Ex. 1001, 17:45–52; *see also id.* 14:23–32).

The parties' experts agree that "non-active" and "active" have specific meanings to a POSITA distinct from the mathematical truth that any vector will

necessarily be zero or non-zero valued. "Non-active" refers to a scenario in which any associated motion vector will necessarily be zero. (Ex. 2014, 130:12-14 ("Q. A non-active motion vector will always be zero. A. Yes."); Ex. 2013, ¶ 41). A non-active scenario in the redefined skip mode results in a functionality like conventional skip mode. (Ex. 1001, 14:23–28 ("[A] macroblock assigned to skip mode is either associated with a zero (non-active) motion vector, in which case it is treated in the same way as a conventional skip mode macroblock and copied directly from the reference frame…")). "Active" refers to a scenario in which any associated motion vector is predicted and is not necessarily zero. (Ex. 2014, 132:3–6 ("Q. So in the non-active scenario, we have -- it's always going to be a zero motion vector. Whereas in the active scenario, it's not necessarily zero? A. It might be zero, it might not be."); Ex. 2013, ¶ 41; *see also* Ex. 1001, 14:38–42). The redefined skip coding mode can address regional and global motions vis-à-vis the possibility of an "active" classification. (*E.g.*, Ex. 1001, 14:48-51, 15:7-14). The '808 Patent provides various embodiments for video coding devices to distinguish non-active scenarios from active ones. (*E.g.*, Ex. 1001, 20:6–25, 19:28–51). Figure 8 (corresponding to Figure 3 of the provisional) depicts the notion of distinguishing active from non-active scenarios.

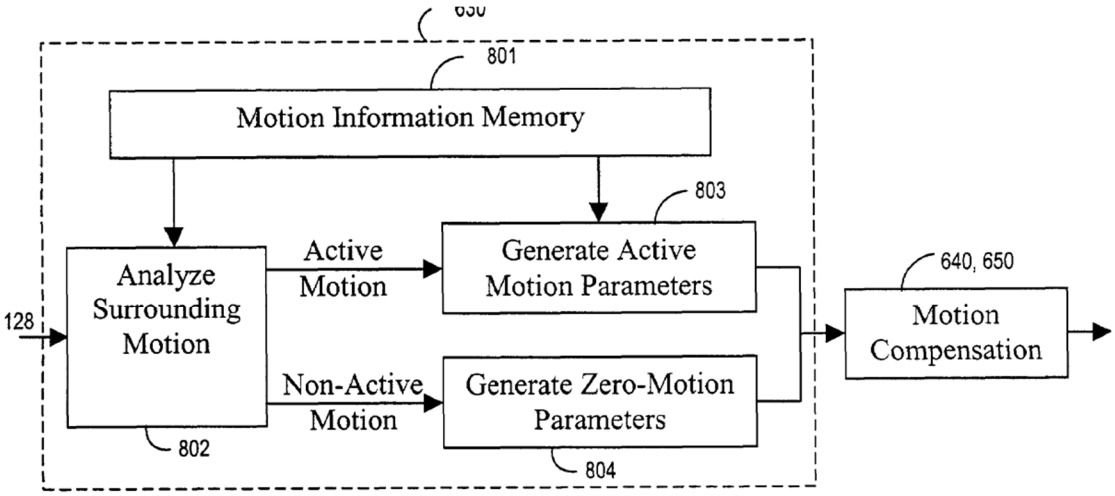

FIG. 8

For Ground 1 (Karczewicz), Petitioner contends a POSITA would combine an alleged "mode" that predicts motion vector fields with an alleged "mode" that does not predict motion vector fields.[3] The idea seems to be that not using a prediction field is akin to conventional skip mode whereas using a prediction field is akin to the '808 Patent's "active" scenario. Recall an image segment can only be assigned one coding mode. Pointing to multiple, different "modes" does not yield the '808 Patent's skip coding mode that requires a single mode defined by a determination of non-active versus active scenarios "depending on the characteristics of the motion in image segments surrounding the macroblock in

[3] Motion vector fields are "are three-dimensional space representations of motion projected onto an image." (Ex. 2013, ¶ 124). These are distinct from the translational motion vectors described in the '808 Patent. (*Id.*)

question." Rather, in Karczewicz which "mode" is used is a function of distinct signaling in the bitstream.

Putting aside that pointing to two separate "modes" in Karczewicz does not disclose the '808 Patent's skip coding mode (even if these two "modes" were somehow combined into one mode, though Petitioner does not explain how), the law requires both a motivation to combine and reasonable expectation of success. Petitioner provides neither. The "modes" in Karczewicz that Petitioner identifies are signaled in mutually exclusive ways. (Ex. 2014, 147:4–149:19, 150:16–21, 153:10–154:7 (describing how the first and second coding "modes" are signaled)). Petitioner provides no evidence for how the signaling for these "modes" could or would be combined with any chance of success. Moreover, the "modes" themselves are mutually exclusive. (*See id.*; *see also* Ex. 2013, ¶¶ 138–140). One cannot both use a prediction field and not use a prediction field. Petitioner provides no details on what a combined "mode" would look like and no explanation for how a device would determine whether to use a prediction field or not for any given block assigned to a hypothetical combined mode.

Moreover, Petitioner's alleged motivation to combine misses the point. Petitioner merely points to benefits of predicting information from neighboring blocks. (Pet., 14–16). This is not an inventive aspect of the '808 Patent. (Ex. 2013, ¶ 96). Petitioner does not provide a motivation for why a POSITA—who already has

the benefit of Karczewicz's "modes" that predict information from neighboring blocks—would modify one of those "modes" to incorporate the functionality of a different "mode" that Karczewicz also already has.

And Petitioner never addresses the distinction between non-active and active motion scenarios "depending on the characteristics of motion in image segments surrounding the macroblock in question." Both Dr. Orchard and Dr. Havlicek agree this is a requirement, yet the Petition fails to address where in Karczewicz this can be found. (Ex. 2013, ¶ 84; Ex. 2014, 129:14–132:6).

Ground 2 (Frojdh) also fails. As a threshold matter, Frojdh is not entitled to its provisional's priority date. Even putting that aside, Petitioner again points to two distinct modes. One is "COPY." The other is "IGMC" (with predicted motion vectors). Like with Karczewicz, the idea behind Petitioner's argument may be that Frojdh's COPY—which Petitioner misinterprets—corresponds to a non-active

scenario whereas IGMC corresponds to an active scenario.[4] However, these modes, alone or combined, do not disclose the '808 Patent's skip coding mode. For Frojdh, as with Karczewicz, Petitioner never addresses the distinction between non-active and active motion scenarios "depending on the characteristics of motion in image segments surrounding the macroblock in question."

Even under Petitioner's interpretation, COPY and IGMC are described by Frojdh as two distinct modes separately signaled using the value of a GMC (Global Motion Compensation) slice flag. (Ex. 1007, ¶¶ 24, 42). Petitioner provides no explanation or argument for how COPY and IGMC could or would be signaled together. According to Frojdh, this would be impossible because a GMC flag for a given slice cannot simultaneously be on and off. (Ex. 2013, ¶ 168). Petitioner provides no explanation for how a combined mode would determine active from non-active scenarios "depending on the characteristics of motion in image segments

[4] Petitioner suggests IGMC alone could satisfy the '808 Patent's skip coding mode merely because it could result in zero or non-zero valued vectors. (Pet., 46). This is a strawman of the lexicography. A POSITA would not trivialize the claims in this way. (Ex. 2013, ¶ 170). Both experts agree that the required aspects of the lexicography require more than the notion that a motion vector might be zero or non-zero valued. (*Id.*; *see also* Ex. 2014, 129:21–130:14, 130:18–131:5, 133:11–134:5).

surrounding the macroblock in question." Moreover, Frojdh teaches away from the '808 Patent's invention with its explicit signaling of separate COPY and IGMC modes. Petitioner provides no explanation for why a POSITA would be motivated to disregard Frojdh's explicit signaling solution in favor of a modified mode that determines active from non-active scenarios "depending on the characteristics of motion in image segments surrounding the macroblock in question," which is nowhere disclosed in Frojdh.

II. BACKGROUND

A. Technical Background

Digital videos consist of pictures or frames. Video coding systems typically divide each frame into smaller units called slices and blocks, where a slice consists of a sequence of blocks. (Ex. 2013, ¶ 44). Blocks are composed of NxM grids of pixels, with pixels representing variations in brightness (luminance) and color (chrominance). One example is a "macroblock," comprising a 16x16 pixel block for luminance. In Figure 9, each box within the frame represents the luminance component of a macroblock that can be individually predicted using a motion vector, which describes the movement of that specific block compared to a reference frame. (*Id.*, ¶ 52).

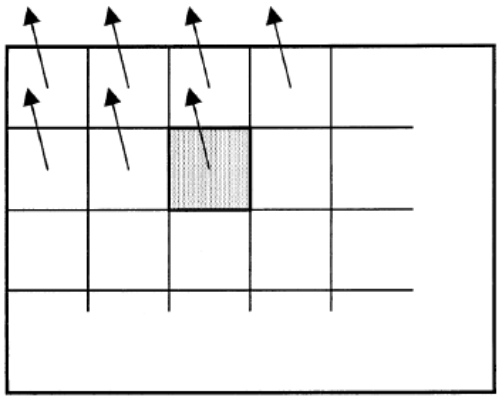

FIG. 9

’808 Patent, Figure 9 (Ex. 1001)

Modern high-definition displays, such as 4K, can contain over 8 million pixels per frame, posing significant challenges for video transmission. Each of these pixels can have a wide range of brightness and color values. This means each video frame contains a staggering amount of information. (Ex. 2013, ¶ 44). To reduce the amount of data needed to transmit, store, and playback video, techniques have been developed to compress and decompress video information efficiently. (*Id.*) Many of these techniques aim to exploit redundancies in video files to achieve efficient compression. Two types of redundancies in video sequences are temporal (similarities between consecutive frames) and spatial (similarities within a single frame). One way to leverage redundancy is to rely on previously decoded information instead of retransmitting the same information for new frames or blocks. (*Id.*, ¶ 45). Motion compensated prediction refers to a category of techniques for predicting the content of a block of pixels using a corresponding region in a reference

frame.[5] (*Id.*, ¶ 46). Motion vectors are used to identify such corresponding regions in reference frames.[6] (*Id.*, ¶ 51). The values of predicted blocks may not be exact matches to the intended block of pixels for display. In such cases, depending on how a given block is coded, residual information or prediction error can be included in a bitstream to enable the decoder to reconstruct an intended block of pixels using a combination of both the predicted block and the prediction error. (*Id.*, ¶ 45). Frames that use reference frames for prediction are known as "Inter-coded" or "P-frames" (predicted frames).

Motion vector prediction is a process by which motion vectors are predicted from previously determined motion vectors (typically from neighboring blocks).

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[5] Motion compensated prediction exploits the fact that consecutive frames in a video sequence often contain similar content with only slight changes due to movement and can significantly reduce the amount of data needed to represent each new frame. (Ex. 2013, ¶¶ 45, 50).

[6] Motion vectors convey both (1) direction and (2) magnitude, typically in two dimensions. Motion vectors are expressed by two directional components (horizontal or vertical components). For example, Figure 9 of the '808 Patent depicts multiple non-zero vectors with the same direction and magnitude. (*Id.*, ¶ 52).

(*Id.*, ¶ 50). In Joint Model 1,[7] discussed extensively in the '808 Patent, one way to predict motion vectors was to determine the median of the motion vectors of three neighboring image segments. (*Id.*, fn. 1).

A block coding mode refers to an understood set of instructions for decoding a block of pixels signaled in a bitstream by an encoder. The '808 Patent lists the coding modes that existed in Joint Model 1 in Table 3. (*Id.*, ¶ 55; *see also* Ex. 1001, 12:26–38). Only one coding mode can be applied to any given block of pixels. (Ex. 2014, 64:4–65:5, 66:1–6). The decision as to which coding mode to apply to a given macroblock is made through a process called motion estimation. (Ex. 2013, ¶ 63). Coding modes instruct decoders, guiding the interpretation and reconstruction of encoded data for each macroblock. The encoder's selection process can be driven by efficiency considerations,[8] evaluating multiple modes and comparing their outcomes to determine the most suitable option. (*Id.*, ¶ 58). The chosen mode is assigned to

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[7] Joint Model 1 (or JM1) is a draft of the H.264 Standard improved by the '808 Patent. The patent's goal was to provide an improved coding mode building from existing coding modes of JM1. (Ex. 2013, ¶ 55).

[8] Encoders are not specified by video decoding standards. Various encoding implementations may have different priorities in terms of quality, compression, and computational complexity. (*See generally* Ex. 2017).

the block of pixels, and appropriate signaling is included in a bitstream. Coding proceeds in raster scan order, proceeding from the top left, across, and down. (Ex. 2017, 6). This allows blocks above and to the left to serve as references for providing possible candidate motion vectors for motion vector prediction, while those below and to the right are unavailable. (*Id.*, 9).

A bitstream will indicate a coding mode for each respective macroblock, along with any necessary additional information such as motion vectors and prediction error. This information allows decoders to accurately reconstruct the original video content. However, where a skip mode is used, prediction error information and motion vector data are omitted or "skipped." (Ex. 2013, ¶ 64). Conventional skip mode was used to copy a block of pixels directly from the same location. No motion vector was needed to convey information about displacement from a reference frame. (*Id.*, ¶ 46).

B. The '808 Patent's Solution

The '808 Patent describes the various coding modes available in JM1 (see Table 3). Initially, the SKIP mode was assigned the lowest bit cost codeword, under the assumption the SKIP mode would be the most frequently used. However, the inventor noticed a significant problem: the SKIP mode was rarely utilized in scenes involving panning, zooming, or similar motions. This inefficiency in coding greatly impacted overall compression performance for video sequences with such scenes.

JM1's SKIP mode omitted residual information and directly copied macroblocks from reference frames without displacement. (Ex. 2013, ¶ 56).

The inventor of the '808 Patent considered existing attempts to solve the problem of global and regional motions (such as panning or zooming). Specifically, the inventor considered global motion vector coding (GMVC) and global motion compensation (GMC). These methods aimed to improve coding efficiency by accounting for large-scale motion affecting an entire frame. Frojdh is an example of a GMC-type approach. The inventor recognized that GMVC and GMC were suboptimal solutions for several reasons. (*Id.*, ¶ 86). First, GMVC and GMC required additional information to be included in the bitstream, which reduced any compression benefits. (Ex. 1001, 13:58–14:10). Second, these techniques were complex and increased computational demands on coding devices. (*Id.*)

To avoid inefficiencies and complexities that limited the effectiveness of GMVC and GMC approaches, the inventor had the idea to take a more local approach to global or regional motions. This led the inventor to redefine JM1's SKIP mode. Specifically, the inventor's redefined JM1's SKIP coding mode preserved SKIP's most basic function (in essence copying) but also provided a way for the new skip coding mode to recognize and address "active" scenarios with predicted motion vectors. Both experts agree the '808 Patent's redefined skip coding mode adapts to active and non-active motion scenarios. (Ex. 2013, ¶ 92; Ex. 2014, 129:14–132:6).

Two exemplary embodiments introduced by the inventor in the ’808 Patent are the “threshold analysis” and “conditional analysis” embodiments. At a high-level, the “threshold analysis” approach compares the absolute values of components resulting from a median motion vector prediction to a threshold value to determine whether a given skipped macroblock should be treated as active or non-active. (Ex. 1001, 19:28–51). The “conditional analysis” embodiment examines whether stationary characteristics exist in image segments surrounding a macroblock in question to determine “active” versus “non-active” motion. (*Id.*, 20:12–25). These embodiments will be discussed in more detail in Section IV below.

The redefined skip coding mode of the ’808 Patent was developed during the H.264 standardization effort. One embodiment describes conditions for classifying “non-active motion” and “active motion.” (Ex. 1001, 20:12–25). This embodiment corresponds to a contribution the inventor made to the H.264 standard called JVT-C027. (Ex. 2015). This contribution is dated after Frojdh’s provisional date but before the Frojdh application. The inventor’s contribution was adopted. (Ex. 2018, 9; Ex. 2013, ¶ 97).

III. CLAIM CONSTRUCTION

A. Skip Coding Mode

The parties dispute the meaning of “skip coding mode.” Patent Owner believes the term “skip coding mode” should be construed, based on the inventor’s

lexicography at 17:45–52, as "a coding mode in which a zero (non-active) motion vector or a non-zero (active) motion vector is associated with each skip mode macroblock, depending on the characteristics of the motion in image segments surrounding the macroblock in question." (Ex. 1001, 17:45–52). Petitioner seeks to alter the meaning of "skip coding mode" to include "and residual information can be provided for each skip mode macroblock." (Pet., 13–14). Petitioner made this same argument to the International Trade Commission ("ITC"), but Petitioner later dropped the contention that the inventor's lexicography needs modification. (Ex. 2020, 2 (stating that the agreed upon construction is "[c]onsistent with the '808 Patent's express lexicography"); *see also* Ex. 2007).

1. A POSITA Would Understand the Redefined Skip Coding Mode is a Single Macroblock Coding Mode

A POSITA would recognize that a coding mode conveys information about how a block has been encoded and how it should be decoded. An encoder indicates the coding mode in the bitstream, which is later received by the decoder. (Ex. 2013, ¶ 59). Each block can be assigned only one coding mode. (*Id.*, ¶ 140; *see also* Ex. 2014, 64:4–65:5 ("And the coding modes of JM1 are enumerated there in Table 3, and so a person of ordinary skill would understand that term to mean those modes."), 66:1–6 ("Q. … The encoder is going to go through some motion estimation process where it undergoes a best mode selection, and then one and only one of those modes

will be selected for the given macroblock. A. As it is put into the encoded bitstream, yes.”)).

2. A POSITA Would Understand that the Terms “Active” and “Non-Active” Have Meaning in the Inventor’s Lexicography

The specification makes clear the distinction between the “non-active” and “active” processes for generating motion vectors has meaning.[9] (Ex. 1001, 14:23–51, 15:61–67, 18:51–19:10, 20:6–16, 24:61–25:3, Figure 8). Both experts agree that “active” and “non-active” have specific meanings and are not synonymous with “non-zero” and “zero” motion vectors. (Ex. 2014, 129:21–130:14, 130:18–131:5, 133:11–134:5; Ex. 2013, ¶ 41). Thus, the ’808 Patent’s skip coding mode does not merely cover any outcome of any set of coding modes that result in zero or non-zero motion vector values. Rather, the ’808 Patent’s skip coding mode is limited to specific processes. In non-active scenarios, assigned motion vectors are always zero-valued as in conventional skip mode. In active scenarios, motion vectors are predicted to represent motion. (Institution Decision, 10). According to the inventor’s

[9] Patent Owner respectfully submits the Board incorrectly states the ’808 Patent “does not specify the processes these [active and non-active motion parameter generation] blocks employ to produce motion vectors.” (Institution Decision, 62). This is contradicted by the ’808 Patent, at least at 14:23–29 (process for non-active) and 19:64–20:3 (exemplary process for active).

lexicography the determination of "active" and "non-active" will "depend[] on the characteristics of motion in image segments surrounding the macroblock in question." (Ex. 2013, ¶¶ 40, 41; Ex. 2014, 129:21–130:14; 130:18–131:5; 133:11–134:5).

The Board found for institution purposes that Frojdh's IGMC mode sufficiently discloses the '808 Patent's skip coding mode. The Board reached this conclusion because the median calculation in Frojdh's IGMC mode could result in a zero or non-zero motion vector. (Institution Decision, 60). However, the Board's reasoning ignores express components of the lexicography of "skip coding mode" and clear descriptions of the invention from the specification. (Ex. 1001, 14:23–35, Figure 8). In particular, the Board treated the lexicography as if the terms "non-active" and "active" were absent or otherwise treated those terms as superfluous despite the overwhelming intrinsic evidence to the contrary and the fact both parties' experts agree these terms are not superfluous or merely synonymous with "zero" and "non-zero." This is incorrect for several reasons.

First, "the inventor's lexicography governs," and "the inventor's intention, as expressed in the specification, is regarded as dispositive." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (citations omitted). The inventor chose to include the distinction between non-active and active processes for generating motion vectors in the lexicography and throughout the specification.

Second, the Board's reasoning runs afoul of "an important principle of interpretation … . It is highly disfavored to construe terms in a way that renders them void, meaningless, or superfluous." *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 809–10 (Fed. Cir. 2021). Under the Board's interpretation of the lexicography, the terms "non-active" and "active" are either ignored (in contravention of *Phillips* and progeny) or mean the same thing as "zero" and "non-zero," which both contradicts the specification and renders the terms "non-active" and "active" superfluous. This also contradicts the opinion of both Dr. Havlicek and Dr. Orchard. (Ex. 2014, 129:21–130:14; 130:18–131:5; 133:11–134:5; Ex. 2013, ¶ 42).

Third, the Board erroneously concluded the '808 Patent does not describe different processes for generating non-active and active motion vectors because it "discloses an embodiment with surrounding motion analysis block 802 removed and active motion parameter generation block 803 activated for all the skip mode macroblocks." (Institution Decision, 62 (internal quotations omitted)). This is labeled an "alternative embodiment" and not within the scope of the challenged claims. (Ex. 1001, 24:42–45). An inventor's lexicography governs, particularly over inconsistent alternative embodiments. *Sinorgchem Co., Shandong v. Int'l Trade Comm'n*, 511 F.3d 1132, 1138 (Fed. Cir. 2007) ("[Where multiple embodiments are disclosed,] we have previously interpreted claims to exclude embodiments where those embodiments are inconsistent with unambiguous language in the patent's

specification."). If the "surrounding motion analysis block" is removed and "active" is "active for all the skip mode macroblocks," as in the "alternative embodiment," the resulting coding mode no longer fits the surrounding motion consideration or "non-active" components of the lexicography of skip coding mode. *Phillips* leaves no ambiguity about how to proceed in this situation: "[T]he inventor's lexicography governs." 415 F.3d at 1316.

3. A POSITA Would Understand "Depending on the Characteristics of Motion in Image Segments Surrounding the Macroblock in Question" to Refer to Two or More Image Segments

Before the ITC, the parties disagreed on the meaning of the term "image segments surrounding the macroblock in question" within the inventor's lexicography. (Ex. 2016, 24–25). Nokia and the ITC Staff argued "image segments" is plural, meaning the construction necessitates at least two image segments surrounding the macroblock) in question. (*Id.*) A POSITA would understand the concept of raster scan order and the video coding process; thus, these two or more image segments would be blocks that were previously coded. (Ex. 2013, ¶ 93).

When distinguishing non-active from active, Patent Owner and Dr. Orchard's position is that two or more image segments must be considered. (*Id.*). Dr. Havlicek argues that "four or more" image segments must be considered. (Ex. 2014, 95:8–12 ("Q. So four or more image segments surrounding the macroblock in question need to be considered in order to satisfy the construction of both parties of SKIP coding

mode, in your view. A. That is my opinion. Yes.”)). However, Amazon (Petitioner in this IPR proceeding) has taken contrary positions at the ITC, including at various times indicating that motion characteristics of “on all sides,” “at least six,” and “more than two” surrounding image segments must be considered. (Ex. 2020, 36–37, 39; Ex. 2021, 3; Ex. 2022, 5, 6, 9; Ex. 2023, 7, 11). Ultimately, the ITC ALJ determined Nokia and Staff’s understanding of the term was correct: “image segments surrounding the macroblock in question” require two or more image segments. (Ex. 2016, 25). Petitioner’s position is baseless, as neither the ’808 Patent’s nor its provisional’s embodiments would meet the claims under Petitioner’s interpretation.

That said, under Petitioner’s interpretation (and Petitioner has the burden in this IPR), Karczewicz and Frojdh do not meet the challenged claims even giving Petitioner every benefit of the doubt in its alleged combinations and ignoring—for this exercise—the legal requirements of motivation to combine and reasonable expectation of success and the fact that neither Karczewicz nor Frojdh distinguish active and non-active scenarios for a single coding mode “depending on the characteristics of motion in image segments surrounding the macroblock in question.” Both Karczewicz and Frojdh do not disclose using four or more image

segments to do anything, much less to distinguish active from non-active scenarios.[10] Additionally, Frojdh and Karczewicz use the term "neighboring," which Dr. Havlicek testified carries a distinct meaning from "surrounding" as used in the inventor's lexicography. (Ex. 1006, 11 ("two neighboring segments"), 12 ("a first neighboring segment and a second neighboring segment"), 16–20; Ex. 1008, 12 ("prediction from neighboring blocks"); Ex. 2014, 94:9–95:7). Petitioner should need to show its alleged Grounds succeed under its own interpretation of the claims.

4. A POSITA would Understand that the Claim Construction is Limited to a "Skip" Coding Mode and "Skip Mode Macroblocks"

A skip mode macroblock is one for which the coding is "skipped." Skipped blocks are inexpensive from a bitrate perspective to signal. (Ex. 2013, ¶ 76). Encoders perform a type of cost analysis in choosing whether to skip code a block. A skip coded block does not need to be the most accurate representation of a block. Rather, an encoder will look to the bit cost of other coding modes versus their

[10] The portions of Karczewicz and Frojdh discussed during Dr. Havlicek's deposition relate to predicting motion fields or motion vectors, which are distinct from the active versus non-active classification required by the '808 Patent's redefined skip coding mode. In any event, Karczewicz and Frojdh do not disclose using four or more image segments for predicting motion vectors (or fields).

improved accuracy to decide on whether skip mode is optimal. (*Id*., ¶ 76). Skip coding has been implemented in various ways, but one consistent aspect is that skip coding is the cheapest to signal in the bitstream, often resulting in less than one bit per skip coded block. (*Id.*, ¶ 75).

A POSITA would understand a "skip mode macroblock" is not any macroblock coded in a manner that results in a similar reconstruction as a skip mode macroblock. For example, a 16x16 inter prediction coded macroblock (which uses motion vector and motion compensated prediction) may result in the same prediction as a skip coded block that copies directly from the reference frame. However, a POSITA would know that the 16x16 operates differently and inherently requires more information to be sent in the bitstream to signal the 16x16 mode rather than the efficient coding of a skipped macroblock. 16x16 mode requires an explicit codeword in the bitstream, a codeword that would be longer than any codeword used for signaling a skip block. (*Id.*, ¶ 83).

As the agreed upon claim construction requires "… associated with each skip mode macroblock…," any disclosure of the functionality of the '808 Patent's skip mode must also be linked to a "skip mode macroblock," not just any conceivable coding mode. (*Id.*, ¶ 84).

A POSITA would understand that any coding mode requiring additional information in the bitstream to be accurately signaled would not constitute a skip

coding mode. This is seen throughout the prior standards where skip coded blocks are routinely signaled with run-length coding or single bit indications. A skip mode necessitates no information on how to decode the block, other than an indication, because both the encoder and decoder recognize how to process a skipped block. To include information distinguishing between different coding functions defeats the entire purpose of having a skip mode in the first place (to signal a skipped block with the lowest bits possible). (*Id.*, ¶ 85).

IV. THE '808 PATENT'S PRIORITY DATE

To claim priority to a provisional application, "the specification of the provisional must contain a written description of the invention . . . to *enable* an ordinarily skilled artisan to practice the invention claimed in the non-provisional application." *New Railhead Mfg., L.L.C. v. Vermeer Mfg. Co.*, 298 F.3d 1290, 129 (Fed. Cir. 2002) (emphasis added). The '808 Patent's provisional application, U.S. Provisional App. No. 60/365,072 (the "'072 Provisional") (Ex. 1005), provides written description support for the challenged claims. The ITC ALJ concluded that "the asserted claims are entitled to the priority date of the provisional application[,]" because "Dr. Orchard offered evidence that each limitation in the '808 Patent could be found in the provisional application[.]" (Ex. 2016, 59 (citing Nokia Reply, 25–28; Staff Br., 37–38); 2013, ¶ 100).

The ’072 Provisional was filed on March 15, 2002, and used the then-draft of the H.264 standard (“JM1”), having a conventional “SKIP” mode, as a starting point. (Ex. 1005, 1).[11] However, JM1’s efficiency suffered because “the assumption of SKIP being always the most probable mode is not valid” when a video sequence contained global motion. (*Id.*, ¶ 8; Ex. 1001, 12:41–47 (using nearly identical language)). The ’072 Provisional described GMC and GMVC attempts to solve the problem of global motion and their shortcomings. (*Id.*, ¶¶ 9–11).

The ’072 Provisional put forth a replacement to JM1’s SKIP mode: “the SKIP mode Macroblocks in a video coding system adapt to the motion of the surrounding image segments.” (Ex. 1005, ¶ 19). Unlike the prior SKIP mode that always used a zero-motion vector for a given macroblock, “[i]f active motion is detected around

[11] A POSITA would be aware of all the claimed structural components and how they operate at the time of the invention. (Ex. 2014, 14:17–16:17, 20:3–15, 23:1–24:2 (demultiplexer); 18:4–13, 21:11–19, 24:5–22 (multiplexer); 42:15–18, 44:21–45:14, 48:14–50:20 (coding controller); 50:21–51:9 (intra-prediction); 51:10–21 (inter-prediction); 52:11–53:6, 54:20–55:14, 60:13–61:18 (motion compensated prediction block); 56:19–58:4 (motion estimation block); 58:11–18 (motion estimation); 59:9–60:7 (motion compensated prediction); 63:7–66:6 (coding mode and macroblock coding mode)).

the Macroblock to be coded/decoded, motion parameters conforming to the motion is generated and the Macroblock is motion compensated. [Thus], there is no additional information that needs to be transmitted from the encoder to the decoder." (*Id.*, ¶ 20). Figure 2 shows how the new SKIP mode would, as part of the "Analyze Surrounding Motion" stage, classify "Active Motion" or "Non-Active Motion." (*Id.*, Figure 2). Motion parameters would be generated according to the results of the "Analyze Surrounding Motion." (Ex. 2013, ¶ 102).

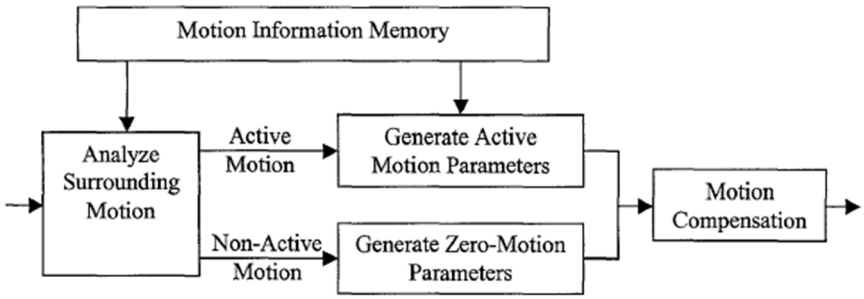

Figure 2: Encoding and decoding block for SKIP mode Macroblocks in a system according to a particular embodiment of the invention.

'072 Provisional, Figure 2 (Ex.1005; *see also* Ex. 1001, Figure 8.)

At the ITC, Patent Owner showed that "the 'threshold analysis' embodiment in the provisional application supports the claims; and (2) the 'conditional analysis' embodiment in the provisional application supports the claims." (Ex. 2016, 60 (citing Nokia Br., 14–16; Nokia Reply, 25–28)). The '072 Provisional discloses these two embodiments for how to classify active from non-active motion dependent

on the characteristics of image segments surrounding the macroblock in question. (Ex. 1005, ¶¶ 24, 34–37).

The "Threshold Analysis" Embodiment of the '072 Provisional.[12] JM1 (referred to as "reference 1") included a way to "generate [a] median motion vector prediction." (*Id.*, ¶ 35; Ex. 2013, ¶ 105). However, this is not the inventive aspect of the embodiment.

> In the preferred embodiment of the invention the 'Analyze Surrounding Motion' block consists of three steps:
>
> [Step 1]-Generate median motion vector prediction for the Macroblock as for example in reference 1[.]
>
> [Step 2]-If any of the resulting motion vector components [have] absolute value larger than a threshold (for example half a pixel) the motion is classified as 'Active Motion'. Otherwise it is classified as 'Non-Active Motion'.
>
> [Step 3]-Depending on the classification result, activate the appropriate block to generating the motion parameters.

(Ex. 1005, ¶¶ 34–37).

Regarding Step 1, paragraph 33 of the '072 Provisional explains that, "[i]n a typical video codec a median predictor is used to predict motion vectors of image

[12] The "Threshold Analysis" embodiment described in the '808 Patent at column 19, lines 28–51, matches paragraphs 34–37 of the '072 Provisional. (*Compare* Ex. 1001, 19:28–51 *with* Ex. 1005, ¶¶ 34–37).

blocks with square shape." (*Id.*, ¶ 33). A POSITA would r understand how to do a "median" calculation. The reference to JM1 is "for example," as stated in paragraph 35 (Step 1). (*Id.*, ¶ 35).

Regarding Step 2, the process of using the classification of either "Active Motion" or "Non-Active Motion" corresponds to the inventor's "skip coding mode" lexicography. Paragraph 38 of the '072 Provisional explains how to "activate the appropriate block to generat[e] the motion parameters" for Step 3 (*Id.*, ¶¶ 37-38):

The novel aspects of the redefined skip coding mode include that the coding mode itself can adapt to active or non-active scenarios depending on the characteristics of motion in image segments surrounding the macroblock in question. The fact that the "Threshold Analysis" embodiment includes a known operation does not detract from the invention. *See Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016) ("[A]n inventive concept can be found in the non-conventional and non-generic arrangement of known conventional pieces.").

The "Conditional Analysis" Embodiment of the '072 Provisional. The "Conditional Analysis" embodiment examines whether stationary characteristics exist in image segments surrounding a macroblock in question to determine "Active" or "Non-Active" motion. (Ex. 2013, ¶ 108). Paragraph 24 of the '072 Provisional (referring to blocks in Figure 2) explains the following:

> The motion analysis in 'Analyze Surrounding Motion' block can be implemented in various ways. For example, continuance, velocity, or deviation of the surrounding motion can be included in the analysis. Also, the coding modes of the already processed Macroblocks can be included. For example, if there is one or more stationary neighboring Macroblocks, 'Non-Active Motion' can be declared.

(Ex. 1005, ¶ 24; *see also id.*, Figure 2).

The "Conditional Analysis" approach in paragraph 24 of the '072 Provisional is similar but not identical to column 20, lines 12–25, of the '808 Patent. (*Compare* Ex. 1001, 20:12–25 *with* Ex. 1005, ¶ 24). The primary differences between the '072 Provisional and the '808 Patent are the inclusion of additional conditions. For example, the '808 Patent's embodiment describes an additional condition relating to macroblock availability, which is not relied upon in the Petition.

As Dr. Orchard explains, the '072 Provisional's written description provides sufficient support for all the challenged claims. (*See* Ex. 2013, ¶¶ 111–120). The table below addresses the limitations challenged by Petitioner. (*See id.*; Pet., 3–4). Dr. Orchard additionally addresses those limitations not challenged by Petitioner and demonstrates full support for the claims in the provisional. (Ex. 2013, 59–77). The '808 Patent is entitled to the March 15, 2002, priority date of the '072 Provisional.

'808 Claims	**Claim Language**	**'072 Provisional Support**
10	"A video encoder for encoding a video sequence"	[0004], [0014], [0019], and [0021]
10	"a multiplexer for providing in an encoded bitstream an indication of the skip coding mode"	[0004], [0023]

10	"a coding controller for assigning a skip coding mode to a first segment"	[0006], [0007], [0008], [0014], [0017], [0022], and Fig. 2
10	"a motion estimation block for assigning either a zero motion vector or a predicted non-zero motion vector for the skip coding mode for the first segment based at least in part on the motion information of a second segment neighboring the first segment"	[0011]-[0012], [0014], [0017]-[0026], [0030]-[0038], and Figs. 2 and 3
16	"A video decoder for decoding an encoded video sequence"	[0004], [0006], [0014], [0019], and [0021]
16	"a demultiplexer for receiving an indication of a skip coding mode assigned to a first segment"	[0006], [0007], [0014], [0017], [0020], [0022], Figs. 1 (referring to JM1, reference 1) and 2
10,16	"forming a prediction for the first segment with respect to a reference frame based at least in part on the assigned motion vector for the skip coding mode, wherein the assigned motion vector is one of the zero motion vector and the predicted non-zero motion vector"	[0004], [0007], [0014], [0017], [0032], [0033], and Fig. 2

V. ALLEGED PRIOR ART

A. Ground 1 – Karczewicz

Petitioner's Ground 1 relies on International Patent Publication No. WO 01/11981 A1 ("Karczewicz") (Ex. 1006). Karczewicz is titled "Apparatus and method for compressing a motion vector field" and names Marta Karczewicz, Jani Lainema, and Bogdan-Paul Dobrin as inventors. It bears mentioning that Jani Lainema is the inventor of the '808 Patent.

Karczewicz discloses an apparatus and method for encoding and decoding using affine motion vector field coding and prediction. (Ex. 1006, 1:7–8; Ex. 2013, ¶ 124). Karczewicz teaches different methods for coding and predicting motion vector fields with affine motion modeling options that consist of (a) a prediction field describing how to predict a motion vector; (b) a refinement field that may enhance a prediction; and/or (c) a zero-motion vector field. (Ex. 1006, 2:9–10, 15:2–5, 17:8–18, 31:22–25, 32:14–25).

A motion vector field is a three-dimensional space representation of motion projected onto an image. Karczewicz describes affine motion vector fields as a special class of motion modeling that uses "motion coefficients" to weight six basis functions known to both the encoder and decoder. (Ex. 2013, ¶ 124). Karczewicz further describes an "MCI" (motion coefficient indicator) that indicates whether these coefficients are included in a bitstream. (Ex. 1006, 37:5–8). The basis functions relate to forms of motion (like translation, rotation, and skewing). (*Id.*, 14:2–5). Affine motion modeling is a distinct approach from video coding schemes based on translational models (such as H.263 and later JM1). (*Id.*, 10:7–11; Ex. 2013, ¶ 125). Karczewicz provides techniques for signaling in a bitstream to instruct decoders on whether or how to predict affine motion vector field coefficients (e.g., the encoder expressly signals coefficients or informs the decoder the neighboring image segments from which to predict or copy coefficients). (Ex. 1006, 25:17–19).

B. Ground 2A – Frojdh, AAPA

Petitioner's Ground 2A relies on U.S. Patent App. Pub. No. 2003/0123738 ("Frojdh") (Ex. 1007) and AAPA. Frojdh is titled "Global Motion Compensation for Video Pictures" and names Per Frojdh, Rickard Sjoberg, and Torbjorn Einarsson as inventors.

Frojdh discloses a method that employs global motion compensation (GMC). (Ex. 1007, ¶ 2). Macroblocks are grouped into slices, and GMC information is transmitted with encoded slices. (*Id.*) Frojdh teaches that GMC is enabled at the slice level. That is, if an encoder indicates GMC for a given slice, that indication applies to all macroblocks within the slice.

Patent Owner disagrees with Petitioner that Frojdh's priority date for purposes of this proceeding is the Frojdh provisional's ("FrojdhProv") (Ex. 1008), U.S. Patent Provisional App. No. 60/334,979, November 30, 2001, filing date. (Pet., 42–44). Frojdh is not entitled to the Frojdh Provisional's priority date. Additional subject matter was included in the Frojdh non-provisional application (Ex. 1007) after FrojdhProv. These changes to the Frojdh non-provisional application were made *after* Nokia provided its JVT-C027 contribution to the H.264 standardization effort. (Ex. 2013, ¶ 148).

Frojdh's COPY mode, as described by the Petition, is not entitled to the priority date of the Frojdh provisional. FrojdhProv discloses a COPY mode which

"signals that the encoder shall copy the macroblock from the (global) motion compensated reference picture." (Ex. 1008, 12). That is, this COPY mode disclosed in the FrojdhProv's proposal requires global motion vector information and "displacements or motion vectors are given by the (interpolated) global motion vectors." (*Id*.) This is the "COPY" mode referred to in FrojdhProv's discussion of IGMC being "reinterpreted." (*Id*.) In contrast, the Frojdh publication, which post-dates both the '808's Provisional and Nokia's contribution disclosing its skip coding mode to the JVT, discloses a COPY mode in which "the motion vector is always zero." Ex. 1007 at ¶ 22. Petitioner relies on the Frojdh publication's COPY mode, rather than the COPY mode of Frojdh's provisional. (Ex. 2013, ¶¶ 148–160).

What occurred is that FrojdhProv included a solution that involved (a) using a COPY mode based on global motion vectors where "[n]o coefficients" (i.e., no residual information) is coded and (b) using a separate IGMC mode. (*Id.*, ¶ 152). Then Nokia provided its JVT-C027 contribution to the standard, which was accessible by all JVT members. (*Id.*, ¶¶ 152–153). The JVT-C027 contribution corresponded to the embodiment of the '808 Patent at 20:6-25. Only after this point, did Frojdh non-provisional application get modified with careful changes to, for example, paragraphs 22 and 55, to change the meaning of "COPY." (*Compare* Ex. 1007, ¶ 22 (changing "COPY with GMC based on explicit MVs" as written in FrojdhProv to simply "COPY mode"), 55 *with* Ex. 1008, 12, 13).

Given that the Petition relies on the Frojdh non-provisional application's "COPY" mode, which is distinct from the COPY of FrojdhProv's proposal, this lack of priority permeates across the subject matter relied on for Ground 1. Thus, Frojdh's priority date is November 27, 2002, the filing date of the Frojdh non-provisional application. Because this date is later than March 15, 2002, the priority date of the '808 Patent, Frojdh cannot be used to prove the unpatentability of the challenged claims.

Additionally, Frojdh's paragraph 56 states:

> As a further feature of the IGMC embodiment, a bitstream representing a coded image block can include a syntactic element which may be interpreted to indicate either the IGMC mode or the COPY mode. A switch between the IGMC and COPY modes may be signalled implicitly, by means of other code elements. Alternatively, this switch may be signalled explicitly by a code word.

(Ex. 1007, ¶ 56). Petitioner relies on paragraph 56's disclosure to show that Frojdh teaches or suggests "providing in an encoded bitstream an indication of the skip coding mode." (Pet., 55–56; Ex. 1001, cl. 10[d]). Petitioner cites pages 11-12 of the FrojdhProv as the sole support for paragraph 56. (Pet., 55–56).

FrojdhProv does not support paragraph 56 or corresponding claims 3, 5, 8, and 9 of Frojdh because it lacks any mention of a syntactic element or switch between the IGMC and COPY modes (even putting aside the fact the description of "COPY" was altered in Frojdh's later document). (Ex. 1007, ¶ 56). Petitioner's citation to pages 11-12 of FrojdhProv fails. Nothing in pages 11-12 discusses

"implicit switching" as described in Paragraph 56 of Frojdh. (Ex. 1007, ¶ 56). Page 11 discusses how GMC information and global motion vectors can be signaled. (Ex. 1008, 12). This is entirely distinct from any switching between IGMC and COPY. (Ex. 2013, ¶ 162). Page 12 provides more examples of global motion vector signaling and then a description of "possible modes" including the COPY mode (which is not how the Petition describes it) and IGMC. Again, nothing about implicit switching implicitly or based on syntactic elements as in Paragraph 56 of Frojdh. Without support for Frojdh's paragraph 56, Frojdh does not teach or suggest "providing in an encoded bitstream an indication of the skip coding mode" even under Petitioner's mistaken theory as of Petitioner's alleged priority date.[13]

Accordingly, Frojdh is not prior art and cannot be used to establish unpatentability of the challenged claims.

C. Ground 2B – Frojdh in view of AAPA and in further view of H.263

Petitioner's Ground 2B relies on Frojdh in combination with AAPA and H.263 (Ex. 1009). H. The basic configuration of H.263 is a combination of inter-

[13] Although Frojdh would no longer be considered prior art due to the later priority date, Patent Owner does concede that Frojdh discloses limitation 1[d], even if the Board determines that Frojdh has the earlier priority date.

picture prediction, utilizing temporal redundancy and transform coding of the remaining prediction error to reduce spatial redundancy. (*Id.*, 2).

VI. ARGUMENT

As a threshold matter, the Petition ostensibly assumes two different scopes of the term "skip coding mode" for purposes of its first and second grounds. For Ground 1, the Petition seems to acknowledge that any "skip coding mode" as defined in the '808 Patent must involve separate processes for "non-active" and "active" scenarios. This appears to be why Petitioner argued that a POSITA would combine two coding options in Karczewicz that (1) predict a motion vector field (ostensibly corresponding to "active") and (2) not predict a motion vector field (ostensibly corresponding to "non-active").

With Ground 2, "skip coding mode" was interpreted much more broadly. The Petition did not give meaning to the "active" and "non-active" language in the '808 Patent's lexicography. Rather, Petitioner implicitly assumed that "skip coding mode" was satisfied by a coding mode that sometimes results in zero-valued motion vectors and sometimes results in non-zero-valued motion vectors despite this being the case for the non-skip coding modes listed in Table 3 of the '808 Patent—and, hence, all relevant prior art described in the specification.

Petitioner is mistaken on both fronts. First, as to Karczewicz, a POSITA would not have combined two mutually exclusive modes of operation in a logically

impossible way. Petitioner provides no explanation how a POSITA could have accomplished this, such as any additional signaling or modifications necessary for video coding devices to distinguish these mutually exclusive options. Moreover, Petitioner fails to demonstrate a POSITA's reasonable expectation of success.

Second, Frojdh is not entitled to its provisional's priority date for the subject matter Petitioner relies on. Even putting that aside, Petitioner fails to adhere to the inventor's lexicography of "skip coding mode," which is consistent with the construction adopted by the Board and by two ALJ's in two ITC investigations.[14] Ex. 2007; ITC 337-TA-1208, Order No. 22.

A. Ground 1 – Karczewicz

Petitioner has not established, by a preponderance of evidence, that the challenged claims are unpatentable under Ground 1.

1. Karczewicz does not disclose coding modes

Petitioner's argument is flawed because it relies on Karczewicz's disclosure that "there are several different ways in which a given segment can be coded" (Ex. 1006, 17:1–2) to be understood as different coding modes. (Pet., 17). Karczewicz

[14] Petitioner and Patent Owner dispute whether the phrase "and residual information can be provided for each skip mode Macroblock" should be appended to the "skip coding mode" lexicography. This dispute is not relevant to this Response.

involves ways of signaling affine motion vector field coefficients and does not teach coding modes. (Ex. 2013, ¶¶ 124–125). This is distinct from coding modes as disclosed in the '808 Patent. (Ex. 2009, ¶ 70).

Petitioner's assertion of five different "coding modes" in Karczewicz is misleading, as none of these alleged modes align with the '808 Patent's singular "skip coding mode." (Pet., 18–19). Karczewicz primarily focuses on affine motion vector fields for segment coding, rather than defining comprehensive coding modes. (Ex. 1006, 2:9–10, 15:2–5, 32:14–25). Specifically, Karczewicz describes either sending motion vector field information or predicting motion vector field information and offering offset information to correct the predicted motion vector field values. Whether the '808 Patent's "skip coding mode" could result in motion vectors potentially similar in value to Karczewicz's motion vectors is inapposite.[15]

[15] The '808 Patent's skip mode will result in similarly valued motion vectors only if one ignores the fact Karczewicz is about three-dimensional affine motion modeling (distinct from the translational approaches of H.263 and H.264) or otherwise assumes zero-valued motion and ignores an entire dimension of Karczewicz's representations. (Ex. 2013, ¶ 124).

2. Karczewicz fails to teach a single coding mode that meets the inventor's lexicography

Even assuming Karczewicz discloses coding modes, it fails to disclose a single coding mode that meets the '808 Patent's skip coding mode. The challenged claims describe both (1) processes of predicting and (2) generating motion vectors in a redefined skip coding mode, which differs significantly from merely identifying zero-valued motion vectors and ignores the processes that led to them. Karczewicz does not provide any coding mode as such, much less a skip coding mode that considers motion characteristics of surrounding image segments to determine whether to interpret skip coding mode as "active" and "non-active" for purposes of deciding how to generate a skip mode motion vector. (Ex. 2009, ¶¶ 61–63).

Petitioner further indicates that "Karczewicz does not discuss what happens if a prediction error of zero is calculated[,]" but that a "POSITA would have found it obvious … not to send prediction error if the prediction error was calculated to be zero." (Pet., 20). However, if the encoder did not send anything, the decoder would read the next bits that were sent (intended to represent some other variable) as encoding the prediction error, and the decoding would fail. (Ex. 2013, ¶ 129).

Petitioner then alleges Karczewicz assigns a "skip coding mode" to a first segment of a first frame of a sequence (i.e., limitation 1[a]) in instances where the first segment is either encoded using a zero-motion vector or with a non-zero motion vector associated with a neighboring block. (Pet., 21–22). Petitioner admits that

these zero-motion vectors and non-zero motion vectors are from separate alleged "coding modes" in Karczewicz but argues that a POSITA would understand that the "two modes together correspond to the '808 Patent's 'modified' 'skip coding,' which groups these two independent functionalities and 'redefines' them as the 'skip coding mode.'" (*Id.*, 22). Likewise, Dr. Havlicek argues there is a first "coding mode" and a second "coding mode" in Karczewicz where the first "coding mode" uses some prediction field and the second "coding mode" does not utilize a prediction field. (Ex. 2014, 153:1–9; Ex. 2013, ¶ 131).

Petitioner's argument conflates the results of the challenged claims (i.e., zero or non-zero-valued motion vectors) with the processes that led to those motion vectors. This trivializes both the challenged claims and the field of video coding. The novel aspects of the challenged claims are not particular values of motion vectors. (Ex. 2009, ¶ 64; Ex. 2013, ¶ 128).

Even ignoring that Karczewicz is about affine motion field models and not "coding modes," Petitioner's arguments ignore the teachings of Karczewicz. Karczewicz teaches explicit signaling for motion coefficients and motion vector field predictions: An encoder expressly signals affine motion coefficients and/or expressly tells the decoder from where to predict or copy a motion vector field. (*See, e.g.*, Ex. 1006, 26:13–24).

By contrast, the challenged claims involve a skip coding mode that considers surrounding motion to determine whether to treat the skip coding mode as active (and then generate a predicted motion vector) or non-active (and then signal a zero-motion vector) to best predict a given image block from a reference frame. Petitioner offers no explanation for how it would even be possible to modify Karczewicz to signal such a coding mode. (*See infra* Section VI(A)(5); Ex. 2013, ¶ 131).

Moreover, the '808 Patent states in claim 10 that "no further motion vector information for the first segment is coded in the encoded bitstream" after the initial skip mode indication. (Ex. 1001, cl. 10; *see also id.*, cls. 11, 15, 21, 44, 47–49, 51–53). This is not the case in Karczewicz at least because Karczewicz requires an MCI bit to indicate the presence or absence of motion coefficients. (Ex. 2013, ¶ 134).

3. Karczewicz teaches away from the '808 Patent by explicitly signaling a motion model and a motion coefficient indication

The disclosures in Karczewicz teach away from the '808 Patent. Karczewicz's system requires signaling a motion model and a motion coefficient indication (MCI) bit in the bitstream. As discussed, the '808 Patent is focused on improving coding efficiency using a redefined skip coding mode. Skip coded macroblocks focus on reducing the bitstream as much as possible while maintaining an adequate fidelity in decoded video. *See supra* III(A)(4). Petitioner argues that "Karczewicz teaches efficiently coding segments, and one way it does this is by using an MCI bit to indicate all-zero refinement field coefficients, rather than coding the zeros

themselves." (Pet., 20). This is incorrect if Petitioner alleges this functionality in Karczewicz is related to the '808 Patent. First, Petitioner ignores "motion coefficient indication (MCI)," as its name suggests," is about a refinement field for affine motion model coefficients. Karczewicz teaches that a "motion vector field is formed of a prediction motion vector field and a refinement motion vector field." (Ex. 1006, 12:22–23). MCI in Karczewicz is about whether refinement or additional information is added to the affine motion coefficients. The challenged claims are unrelated to this process, as skip coding modes automatically skip both motion vector data (which would include any residual information added to motion vectors, which is loosely akin to "Karczewicz's" refinement field) and prediction error (i.e., residual information added to a prediction of a block of image data that was made based on some motion vector, or affine motion field as is the case in Karczewicz). (Ex. 2009, ¶¶ 66–67; Ex. 2013, ¶¶ 133–134).

The MCI is not a coding mode or an indication of a coding mode but a separate bit in the bitstream that signals the presence (or absence) of coefficients to represent Karczewicz's refinement motion vector field. If the "coding mode" that Petitioner contends would be obvious for a POSITA to create by combining different teachings of Karczewicz was really a "coding mode," then the value of MCI would automatically be set to 0 by virtue of the alleged assignment of "skip coding mode," and it would not be necessary to set MCI to 0. This reinforces the fact Karczewicz

teaches away from the '808 Patent's skip coding mode, where no additional information is sent in the bitstream. (Ex. 2009, ¶ 67). Moreover, Petitioner's argument is inconsistent with a POSITA's understanding of a "skip coded macroblock" as a skip coded macroblock has no possibility for information other than the fact that it is skipped. (Ex. 2013, ¶¶ 134–135).

4. Petitioner fails to identify what modifications would be performed to make its alleged combination of two "coding modes" possible

The Petition fails to explain what modifications would be needed performed to make this alleged combination of two "coding modes" possible. Karczewicz discloses an MCI bit that is set to zero when no refinement motion coefficients are included with a block of data. The MCI bit instructs the decoder whether to expect enhancement information related to a predicted affine motion field. (Ex. 1006, 37:5–13). The MCI bit does not indicate how a predicted block has been coded in the bitstream. (*Id.*) For example, the MCI bit says nothing about whether a block is represented by a motion prediction field. (*Id.*, 17:8–18, 31:22–25; Ex. 1003, ¶¶ 99–103). Karczewicz describes separate signaling in the bitstream for these coding options so a decoder can distinguish when, e.g., a block is represented by a prediction field from, e.g., when a block is assigned a zero-motion vector field. (*See, e.g.*, Ex. 1006, Figure 2 (signaling both prediction motion vector field and refinement motion vector field information)). Separate from any MCI bit, Karczewicz expressly

instructs a decoder how a predicted block has been coded. (*Id.*, 17:23–25; Ex. 2013, ¶¶ 134–136).

The Board found Karczewicz's MCI bit can be set to zero (indicating no refinement information in a bitstream) in two situations. (Institution Decision, 31). The first is where a segment is coded "using a zero-motion vector field, e.g., a copy from the reference frame." (*Id.*) In this situation, an encoder sends a zero-motion vector field for a segment. The second is where a segment is "represented as a prediction field only . . . when the segment can be adequately represented in terms of the motion field of one or more of its previously coded neighbors." (*Id.*) Here, an encoder instructs a decoder to form a predicted motion vector field for a segment. The encoder "provide[s] information about the neighboring segment(s) used in the prediction." (Ex. 1006, 17:23–25). In each case, an encoder sets the MCI bit to zero to indicate no refinement information is present in the bitstream and then, if a segment is represented as a prediction field, separately instructs the decoder how the segment has been coded. (Ex. 2013, ¶ 138). Without these instructions, a video coding device would not know whether to use a prediction field or a zero-motion vector field for a given block in lieu of a prediction. A device cannot both use a prediction field and not use a prediction field. This is an irreconcilable contradiction. (Ex. 2013, ¶¶ 135–136).

Karczewicz must signal these two options separately. A POSITA would understand that the MCI bit relates only to the presence of motion vector refinement information and is irrelevant to the so-called "coding mode" being used. In this sense, and ignoring Karczewicz's other deficiencies, the MCI flag is an additional indication in the bitstream that the '808 Patent avoids.

5. Petitioner fails to show a motivation to combine and a reasonable expectation of success in combining two of Karczewicz's mutually exclusive modes of operation

"An obvious determination requires finding that a person of ordinary skill in the art would have been motivated to combine or modify the teachings in the prior art and would have had a reasonable expectation of success in doing so." *Regents of Univ. of Cal. V. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018). Petitioner fails to show a plausible motivation to modify Karczewicz as alleged. And Petitioner fails to make any showings about how a POSITA would have had a reasonable expectation of success in combining two of Karczewicz's mutually exclusive modes of operation.

A POSITA is "a person of ordinary creativity, not an automaton." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). However, like all people, a POSITA is bound by the law of noncontradiction. *See also id.* (referring to a POSITA's common sense). As stated, a video coder cannot both ***use*** a prediction field and ***not use*** a prediction field for a given block. These are mutually exclusive propositions

and cannot be a single "coding mode" without additional modification. A coherent encoding or decoding process must include a means to determine whether to use a prediction field or not for a given block. (*See* Ex. 1006, 17:4–8 (coding option information must be sent in an "unambiguous way")).

The Board found a POSITA "would have been able to fit those modes [Karczewicz's coding options with (1) a prediction field and (2) an all zero motion vector field] together."[16] (Institution Decision, 36). This is implausible. To potentially do so with Karczewicz as a starting point, a POSITA would need to reject the teachings of Karczewicz as to how its coding options are signaled. The POSITA would need to modify Karczewicz to use a translational motion model as opposed to an affine motion model with motion coefficients. The POSITA would need to develop a mode that considers surrounding motion to classify active versus non-active processes for purposes motion vector association even though Karczewicz

[16] It is unclear from the Board's decision whether the Board separately found the two different coding options to—apart from any alleged combination—disclose the '808 Patent's skip coding mode. (Institution Decision, 32–33). This would be incorrect. The claims require a coding mode "for a first segment." Multiple coding options—particularly mutually exclusive ones—cannot be simultaneously assigned or indicated for a single segment. The Petition does not argue otherwise.

says nothing about this. Then the POSITA would need to develop a signaling mechanism for the '808 Patent's skip coding mode, which again is not provided by Karczewicz.[17] The POSITA would need to modify Karczewicz's encoder and decoder to understand the new signaling mechanism. (Ex. 2009, ¶ 65). Karczewicz would not motivate a POSITA to arrive at this unconfirmed, unspecified solution. (Ex. 2013, ¶¶ 138–140). Petitioner fails to articulate a plausible basis for why a POSITA would be motivated to make all these changes to Karczewicz. Karczewicz's MCI bit does not avoid this deficiency. The MCI bit indicates whether refinement is included in the bitstream, not whether or how a block is predicted.

6. Petitioner's argument regarding rate distortion in Karczewicz is misguided

Petitioner additionally alleges "a POSITA would have understood the decision to code a second segment with [zero motion vector] or [potential non-zero motion vector] depends on the motion characteristics in the neighboring segment(s), as consistent with all proposed constructions of 'skip coding mode[]'. (Pet., 24). This is because, according to Petitioner, "Karczewicz teaches determining the efficient coding mode by balancing distortion due to coding the second segment with reference to a neighboring segment against the amount of data required to transmit

[17] Table 3 provides the macroblock coding modes of JM1. JM1 did not exist at the time of Karczewicz.

the second segment against the amount of data required to transmit the second segment's motion vector information." (*Id.*, 25; *see also* Ex. 1006, 15:15–20). However, the considerations suggested by Karczewicz for how to determine what motion vector fields to use in coding a segment is irrelevant to whether Karczewicz teaches any "coding modes" at all, particularly the '808 Patent's skip coding mode. (Ex. 2013, ¶ 136).

Additionally, Petitioner's argument regarding balancing distortion is both a conflation fallacy and, in any event, exclusive to encoders. First, the conflation fallacy is that Petitioner conflates an encoder's process for deciding what coding options to use, which considers and compares all available coding options, with the process specified within the '808 Patent's redefined skip coding mode that—for a macroblock that has been coded with this mode—considers surrounding motion to determine how to interpret the skip coding mode. During motion estimation, an encoder will in essence try out various coding options to determine which options work best. (*Id.*) This is not to be confused with what occurs within the context of using or trying a particular coding mode. Karczewicz's encoder's consideration of available coding options does not take place within the context of a single coding mode and does not consider motion surrounding a skip coded macroblock to determine how to interpret a skip coding (or any other) mode.

Second, putting aside the conflation fallacy, Petitioner's argument does not apply to the challenged decoding claims. Decoders are not capable of performing rate distortion optimization. This is because (1) the decoder does not choose how to code a block. Rather, a decoder merely interprets a block as it is signaled in the bitstream. And (2) a decoder does not have the necessary information to perform rate distortion optimization. Rate distortion optimization requires knowing what the uncompressed or RAW block is to determine the distortion of the block caused by predictive coding options versus the bitrate used to signal the block in the bitstream. A decoder never has access to uncompressed or RAW data. Thus, Petitioner fails to identify any teachings in Karczewicz of a "skip coding mode" that would automatically assign a zero motion vector or trigger the calculation of a predicted motion vector from neighboring blocks, based on the nature of motion in surrounding image segments. Therefore, Karczewicz fails to teach at least limitation 10[a]. (*Id.*, ¶ 132; Ex. 2009, ¶ 68).

Petitioner's arguments that Karczewicz teaches limitations 10[b]-[d] likewise fail. (Pet., 25–29). Karczewicz fails to teach at least elements 10[a]-[d] and 16[a]-[c] because it does not teach any coding mode that would automatically trigger the functionalities required to meet these claim limitations. Petitioner has failed to show by a preponderance of evidence that the challenged claims are unpatentable based on this Ground.

7. Dependent claims 44, 47–48, 58–59

Dependent claims 44, 47–48, and 58–59 all include a derivation step to predict a non-zero motion vector. Petitioner interprets the derivation step to mean that the "skip coding mode" is assigned. (*See, e.g.*, Pet., 31–32 (indicating that limitation 44[b] is "after the 'skip coding mode' is assigned" which correlates the deriving step in limitation 44[a] to mean assigning a skip coding mode)). Petitioner's interpretation is incorrect, as Petitioner conflates the assigning and deriving steps. Petitioner thus fails to meet its burden for these dependent claims, too. (Ex. 2013, ¶ 141).

The '808 Patent distinguishes between distinct steps in its process: "assigning a skip coding mode," as in claims 10 and 16, assigning either a zero or non-zero motion vector, and "deriving the predicted non-zero motion vector," as in claims 44, 47–48, 58–59 (in the event of active motion). The initial "assigning" step involves determining whether a segment should use the skip mode with a zero motion vector (non-active) or predicted motion vector (active).[18] (Ex. 1001, cl. 10, cl. 16). is distinct from the "deriving" step, which calculates or estimates what a predicted motion vector should be. (Ex. 2013, ¶ 142).

[18] Dr. Havlicek agrees that "[t]he assigning [step] is that you assign a specific motion vector to a segment." (Ex. 2014, 123:1–5).

B. Ground 2A – Frojdh in Combination with AAPA / Ground 2B – Frojdh in Combination with AAPA and H.263

Petitioner has not established, by a preponderance of evidence, that the challenged claims are unpatentable under Grounds 2A or 2B. As an initial matter, as discussed, the Frojdh subject matter relied upon by Petitioner is not entitled to the priority date of the Frojdh provisional. Rather the priority date for the Frojdh subject matter is the date of the Frojdh publication, which post-dates the '808 Patent's priority date. Even so, the subject matter from the Frojdh publication relied upon by Petitioner fails to disclose the Challenged Claims.

1. Frojdh fails to teach a single mode that meets the inventor's lexicography

The '808 Patent and Frojdh propose distinct approaches. As illustrated in Figure 8 below, the '808 Patent introduces a novel skip mode that involves a classification of non-active (akin to conventional skip mode) from active motion vector generation, with the selection mechanism based on a consideration of motion characteristics in surrounding image segments. (*See* Ex. 1001, 18:28–30, 18:62–19:10). In other words, the '808 Patent has one skip coding mode that uses surrounding motion to determine how to generate motion vectors, contingent upon an active versus non-active classification. Petitioner (Amazon) argued for this interpretation of the claims during the ITC proceeding. (*See* Ex. 2008, 48 ("[D]uring claim construction, Nokia recognized the asserted claims require analyzing

'surrounding' motion. … [T]his is consistent with the provisional, the claims of the provisional, and the specification of the '808 patent.") (Respondents' Joint Pre-Hearing Brief); Ex. 2013, ¶ 165).

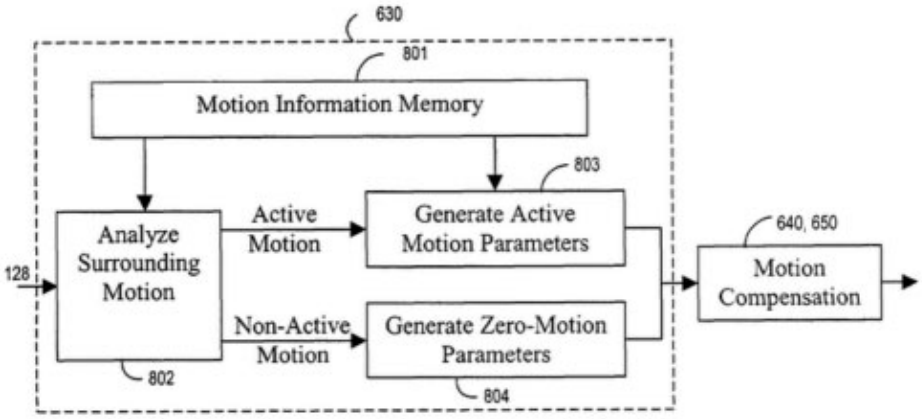

FIG. 8

'808 Patent, Figure 8 (Ex. 1001)

Frojdh discloses video compression techniques that rely on GMC. (Ex. 1007, ¶ 2). Macroblocks are grouped into slices. GMC information is transmitted with encoded slices. (*Id.*) GMC is enabled at the slice level. That is, if an encoder indicates GMC for a given slice of macroblocks, that indication applies to all the macroblocks within the slice. (Ex. 2014, 81:3–7 ("[T]he same global motion vectors are going to be used in every slice[.]"). When the GMC slice flag is "on," Frojdh teaches that signaling for COPY mode is reinterpreted as a mode called Implicit Global Motion Compensation ("IGMC"). (*Id.*, 84:6–12). IGMC predicts a motion vector or a current block by calculating the median value of the motion vectors associated with three neighboring, previously coded blocks. This is the same technique the '808

Patent describes was performed by prior art coding modes. (Ex. 1001, 12:25–37, 19:36–41; Ex. 2013, ¶¶ 166–168).

In contrast to the ’808 Patent approach, the Petition relies on two different coding modes in Frojdh: COPY and IGMC. Frojdh’s method relies on explicit signaling in the slice header to distinguish between these modes. When the GMC slice flag is on, a decoder knows that signaling used to indicate “COPY” mode indicates IGMC mode. Conversely, when the GMC slice flag is off, a decoder will interpret the signaling as indicating COPY mode. Unlike the ’808 Patent, Frojdh does not involve any consideration of surrounding motion to determine how to generate motion vectors. Rather, Frojdh takes an explicit signaling approach that requires additional data in the bitstream for implementation. This explicit signaling approach is crucial in Frojdh’s system because the encoder must inform the decoder how to generate motion vectors (e.g., as in IGMC) and whether to anticipate global motion vectors (that are utilized when the GMC flag is on). (Ex. 1007, ¶ 24 (“Usefully, GMC information contained by respective slices of the frame comprises global motion vectors respectively referenced to the video frame.”); *see also* Ex. 2013, ¶ 168).

It is worth noting that the only disclosures in Frojdh that suggest anything other than discrete, mutually exclusive signaling of IGMC mode as distinct from COPY mode are found in paragraph [0056] (and suggested in claims 3, 5, 8, and 9

of Frojdh). Though, as explained in Section V(B), these disclosures in Frojdh lack support in the Frojdh provisional application that Petitioner relies on for identifying Frojdh as prior art to the '808 Patent.[19] Despite this apparent inconsistency, Patent Owner will still address Petitioner's arguments based on these unsupported disclosures. (Ex. 2013, ¶ 169).

Petitioner contends that the IGMC mode constitutes a skip coding mode under parties' agreed portions of the construction because IGMC associates either a non-zero (active) motion vector or a zero (non-active) motion vector with each skip mode macroblock, depending on whether the predicted motion vector equals to zero. (Pet., 46–47). Petitioner further asserts that not all macroblocks need to be motion compensated. For IGMC mode, Petitioner indicates that "the motion vector for a block is *predicted* from the neighboring blocks' motion vectors," potentially resulting in a zero motion vector. (Pet., 48 (emphasis added); Ex. 1007, ¶¶ 22, 55; Ex. 1008, 6, 12–13). This argument misunderstands the '808 Patent's lexicography, even according to Petitioner's own expert. (Ex. 2013, ¶¶ 40–43; Ex. 2014, 129:21–130:14; 130:18–131:5; 133:11–134:5).

[19] As stated, these portions of the Frojdh application were only added after Nokia's skip mode contribution was proposed and then adopted into the H.264 standard. (Ex. 2013, ¶ 148; Ex. 2018, 9).

Unlike Frojdh's approach, the '808 Patent defines a non-active motion vector as one that is not predicted but is instead automatically generated with zero-valued motion parameters in response to a non-active motion classification after consideration of surrounding motion. This distinction is crucial, as the mere occurrence of a zero-valued predicted motion vector, for example in Frojdh's IGMC, does not equate to the non-active motion vector generated after considering surrounding motion as described in the '808 Patent's lexicography of "skip coding mode." (*See supra* Section VI(B)(1)(b) (discussing the inventor's lexicography); Ex. 2013, ¶¶ 171–173).

Petitioner's argument conflates results with (the claimed) process. In Frojdh's IGMC mode, motion vector predictions are always used, which, when viewed through the lens of the '808 Patent terminology, would be akin to "active" motion vectors. This prediction always occurs whenever IGMC is signaled regardless of motion characteristics in surrounding image segments. Consequently, the assignment of IGMC mode in Frojdh fails to disclose or render obvious the "skip coding mode" as defined in the '808 Patent. Thus, assigning the IGMC mode defined in Frojdh to each skip mode macroblock does not disclose or render obvious limitations 10[a]-[d] and 16[a]-[c]. (*See id.*; *see also* Ex. 2013, ¶¶ 171–173).

2. Frojdh's explicit signaling of its IGMC and COPY modes fails to disclose a skip coding mode and teaches away from the challenged claims

Petitioner alleges that Frojdh teaches or suggests assigning the skip coding mode, such as IGMC mode, or GMC with IGMC and COPY, to a first segment of a first frame of a sequence (i.e., the rest of limitation 1[a]). (Pet., 51). However, Petitioner is incorrect for at least two reasons. First, "GMC," which is signaled on a per slice basis. Second, the combination of "GMC with IGMC and COPY" is both unexplained by Petitioner and not possible under Frojdh's teachings. (Ex. 2013, ¶¶ 174–175). This can be illustrated with reference to Frojdh Figure 9 below ("a schematic diagram representing proposed global motion compensation in H.26L on picture and macroblock levels"). (Ex. 1007, Figure 9; *see also* Ex. 2013, ¶ 175).

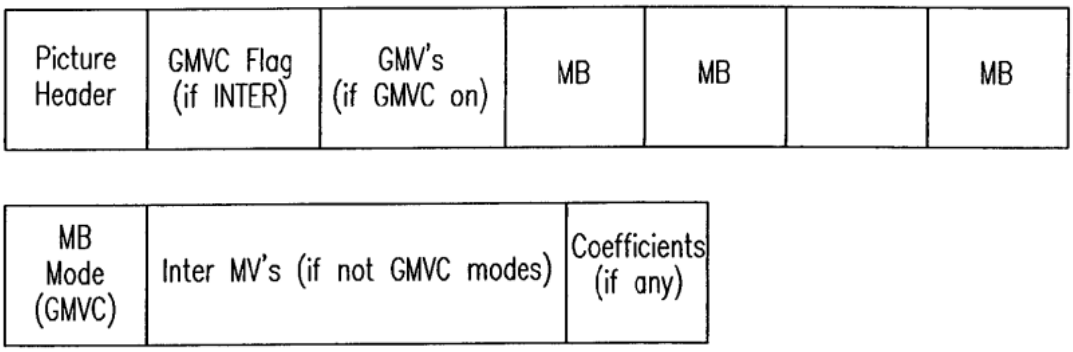

FIG. 9

The GMC flag (referred to as GMVC flag in Figure 9, perhaps erroneously) is signaled at a higher layer than the macroblock syntax (marked with "MB" in

Figure 9).[20] The "MB Mode" is then signaled separately for each macroblock. (*See* Ex. 1007, ¶ 22 (describing IGMC as a "more useful MB mode than COPY mode" in "many coding scenarios")). If GMC is on for an IGMC implementation, COPY cannot be signaled. (*Id.*, ¶ 55). By contrast, if GMC is off, then an encoder cannot signal IGMC. (*Id.*) These mutually exclusive conditions demonstrate that Petitioner's assertion of "GMC with IGMC and COPY" as a possibility in Frojdh is incorrect. (Ex. 2013, ¶ 177).

Limitation 10[d] is also problematic for Petitioner's proposed interpretation.[21] Limitation 10[d] requires that an indication of skip coding mode (which Petitioner alleges corresponds to Frojdh's GMC) be included in the bitstream (Pet., 44), wherein no further motion vector information vector information for the first

[20] The lower portion of Figure 9 refers to the syntax structure for the macroblocks marked "MB" in the upper portion of Figure 9. (Ex. 2013, ¶ 162).

[21] As discussed in Section V(B), Petitioner relies on paragraph 56 of Frojdh and pages 11 and 12 of FrojdhProv as support that Frojdh discloses limitation 10[d]. However, FrojdhProv does not provide written description support for paragraph 56 of Frojdh. Therefore, Frojdh cannot claim priority to FrojdhProv's filing date for purposes of meeting claim limitation 1[d]. (*See supra* Sections IV and V(B)).

segment is coded in the encoded bitstream. However, this requirement directly contradicts Frojdh's definition of GMC. Frojdh explicitly states the following:

> The method comprises … applying a signal to each encoded slice to indicate whether global motion compensation (GMC) is used in reconstructing its corresponding original slice, and if so, including GMC information with the encoded slice. (Ex. 1007, ¶ 24).

Frojdh specifies that "the GMC information contained in a given encoded slice comprises or represents a set of encoded global motion (GM) vectors." (*Id.*, ¶ 25). The third box in the top row of Frojdh's Figure 9, provided above, makes clear that GM vectors (GMVs) are included in the bitstream at the beginning of the slice to which those GMVs apply. The inclusion of these GMVs is critical to Frojdh's proposal and contradicts the claimed requirement of "no further motion vector information vector information." Additionally, all FrojdhProv's disclosures teach including at least one global motion vector when GMC is on. (Ex. 1008, 11–12), Thus, GMC in Frojdh requires including additional motion information with the "first segment" slice. This directly conflicts with the Petitioner's attempt to interpret GMC (which is signaled on a per-slice basis) as somehow equivalent to assigning a skip coding mode to a "first segment" under the '808 Patent, which prohibits including any additional motion information with the first segment. (Pet., 51; *see also* Ex. 2013, ¶ 176).

Given these inconsistencies, Petitioner's arguments to support that Frojdh teaches limitations 10[b]-[d] likewise fail. (Pet., 51–56). As explained above, Frojdh

does not disclose or render obvious assigning a skip coding mode to a first segment as required by the ’808 Patent. Consequently, it is impossible for Frojdh to meet the additional constraints of these limitations for a skip coding mode that was never assigned to the first segment in the first place. Accordingly, Frojdh fails to teach at least elements 10[a]-[d] and 16[a]-[c] and their respective dependent claims.

3. Petitioner fails to identify how IGMC and COPY modes would be combined by a POSITA within Frojdh and fails to demonstrate a motivation to make the alleged modification or any reasonable expectation of success

Petitioner raises in its 10[b] argument that “Frojdh further discloses how COPY mode (and the associated [zero motion vector]) ‘is the cheapest mode to signal. In fact, run-length coding is used to signal a number of copied (skipped) macroblocks with one codeword.’” (Pet., 53 (citing Ex. 1007, ¶ 47; Ex 1008, 8–9); Ex. 2013, ¶ 177). However, this argument overlooks a crucial aspect of Frojdh’s teaching. In Frojdh, when GMC is on, COPY signaling is interpreted as IGMC. This means that the signaling cost for COPY and IGMC must be identical, as they use the same signal. Assuming Petitioner’s understanding of Frojdh’s COPY mode is correct and entitled to the date of FrojdhProv, a POSITA would not find it obvious to modify Frojdh’s teachings to provide access to both modes under GMC. (Ex. 2013, ¶ 177). Petitioner provides no explanation for how COPY and IGMC would both be signaled *as a single mode*. Petitioner does not explain how a video coding device would know whether to apply COPY or IGMC mode functionalities even

assuming the two modes were signaled at once. (*Id.*) Petitioner cannot show motivation to combine or reasonable expectation of success without articulating what specific coding mode would result from the alleged modification of Frojdh or how that mode would work.

4. Petitioner's Grounds directed to dependent claims fail as well

Petitioner's Ground 2A directed to claims 11, 21–22, 44, 47–49, 58–60, and 64 fail for the same reasons that Ground 2A fails to disclose independent claims 10 and 16. Petitioner raises no additional arguments to overcome the shortcomings related to claims 10 and 16 and merely repeats the same arguments to satisfy the dependent claims. In addition to Frojdh and AAPA, Petitioner's Ground 2B further relies on H.263. Ground 2B only relates to dependent claims 15, 20, 51–54, and 62–63 and accordingly fails for the same reasons as Ground 2A. Therefore, Ground 2B rises and falls with Ground 2A. *See In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (indicating that "[d]ependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.").

VII. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board reject Petitioner's arguments and uphold the challenged claims of the '808 Patent as valid.

Dated: March 20, 2025

Respectfully submitted,

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CERTIFICATION OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned **PATENT OWNER'S RESPONSE** specified in 37 C.F.R. §42.24 have 13,417 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. §42.24(b)(1). This word count was prepared using Microsoft Word 2010.

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CERTIFICATION OF SERVICE

The undersigned hereby certifies that a copy of this **PATENT OWNER'S RESPONSE PURSUANT TO 37 C.F.R. § 42.10(b)** has been served on Petitioner via email on the following counsel of record for Petitioner:

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